MathFLIX CHALLENGE

Prime Numbers and Goldbach's Conjectures

Goldbach first proposed his conjecture in a letter to the Swiss mathematician **Euler** in **1742** claiming that "every number greater than 2 is an aggregate of three prime numbers." Because mathematicians in Goldbach's day considered 1 a prime number (prime numbers are now defined as those positive integers greater than 1 that are divisible only by 1 and themselves), Goldbach's conjecture is usually restated in modern terms as: Every even natural number greater than 2 is equal to the sum of two prime numbers.

The first breakthrough in the effort to prove Goldbach's conjecture happened 188 years after Goldbach's letter to Euler when a Soviet mathematician Lev Genrikhovich Shnirelman proved that every natural number can be expressed as the sum of not more than 20 prime numbers. The latest refinement came in 1973, when the Chinese mathematician Chen Jing Run proved that every sufficiently large even natural number is the sum of a prime and a product of at most two primes.

When mathematicians study, they sometimes run across results that they are sure are true, but that they can not (yet) prove. These results are called **conjectures**.

Every <u>even counting number greater than 2</u> can be expressed as the sum of two primes.		**Every <u>odd counting number greater than 7</u> can be expressed as the sum of three odd primes**

First 20 prime numbers:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71

Even number	Sum of two primes		Odd Numbers	Sum of three primes
4	2 + 2		9	3 + 3 + 3
6	3 + 3		11	3 + 3 + 5
8			13	
10			15	